

CLAIMS

What is claimed is:

1. A single lumen intra-aortic balloon catheter system comprising a catheter and a guide wire for insertion as a unit through an insertion site and tissue track of a patient into a blood vessel of the patient,
said catheter comprising a catheter tube having distal and proximal ends, a balloon membrane having distal and proximal ends, and a tip having a lumen, the proximal end of the balloon membrane being connected to the distal end of the catheter tube and the distal end of the balloon membrane being connected to the tip,
said guide wire comprising a guide section and a more proximal pull section,
said pull section having a smaller cross sectional area than the guide section.
2. The catheter system as claimed in claim 1 wherein the guide section is stiffer than the pull section.
3. A single lumen intra-aortic balloon catheter system comprising a catheter and a guide wire for insertion as a unit through a tissue track into a blood vessel of a patient,
said catheter comprising a catheter tube having distal and proximal ends, a balloon membrane having distal and proximal ends, and a tip having a lumen, the proximal end of the balloon membrane being connected to the distal end of the catheter tube and the distal end of the balloon membrane being connected to the tip,
said guide wire comprising a guide section and a more proximal pull section,
when the catheter and pull section are placed side-by-side inside the tissue tract an outer surface of the

catheter and pull section and the tissue tract define a first leakage area through which blood can flow, when the catheter and guide section are placed side-by-side inside the tissue tract an outer surface of the catheter and guide section and the tissue tract define a second leakage area through which blood can flow, the dimensions and cross sectional shape of the guide and pull sections being such that the first leakage area is smaller than the second leakage area.

4. The catheter system as claimed in claim 3 wherein the pull section has a smaller cross sectional area than the guide section.
5. The catheter system as claimed in claim 3 wherein the guide section is stiffer than the pull section.
6. A method for inserting a single lumen intra-aortic balloon catheter comprising a catheter tube having distal and proximal ends, a balloon membrane having distal and proximal ends, and a tip having a lumen, the proximal end of the balloon membrane being connected to the distal end of the catheter tube and the distal end of the balloon membrane being connected to the tip, a distal guide portion of a guide wire being disposed within the tip lumen and extending beyond a distal end of the tip, said method comprising the step of passing the catheter along with the guide wire as a unit through a tissue tract and into a blood vessel of a patient as a unit and advancing said unit to a position in the vasculature of the patient appropriate for pumping.
7. The method as claimed in claim 6 wherein the distal portion of the guide wire is passed through the tissue tract into the blood vessel via a preinserted insertion sheath.
8. The method as claimed in claim 6 comprising the additional step of pulling the guide wire out of the blood vessel while holding the catheter in place.

9. The method as claimed in claim 6 wherein the guide wire further comprises a pull section proximal to the guide section, said pull section having a smaller cross sectional area than the guide section.
10. The method as claimed in claim 6 wherein the guide wire further comprises a pull section proximal to the guide section, said guide section being stiffer than the pull section.
11. The method as claimed in claim 6 wherein the blood vessel is the femoral artery, axillary artery, brachial artery, or the radial artery.
12. A method for inserting a single lumen intra-aortic balloon catheter comprising a catheter tube having distal and proximal ends, a balloon membrane having distal and proximal ends, and a tip having a lumen, the proximal end of the balloon membrane being connected to the distal end of the catheter tube and the distal end of the balloon membrane being connected to the tip, a distal guide portion of a guide wire being disposed within the tip lumen and extending beyond a distal end of the tip, said method comprising the steps of: (a) passing a preinsertion guide wire into a patient's blood vessel; (b) passing an insertion sheath over said guide wire at least partially into the blood vessel; (c) removing the preinsertion guide wire; (d) inserting the distal portion of the guide wire into the blood vessel through the insertion sheath; (e) removing the insertion sheath from the blood vessel while leaving the distal portion of the guide wire within the blood vessel; (f) passing the catheter along with the guide wire as a unit into the blood vessel and advancing said unit to a position appropriate for pumping; and (e) pulling the guide wire out of the blood vessel while holding the catheter in place.
13. The method as claimed in claim 12 wherein the preinsertion guide wire is inserted into the blood vessel through an

angiographic needle which is removed after insertion of the preinsertion guide wire.

14. The method as claimed in claim 12 wherein the guide wire further comprises a pull section proximal to the guide section, said pull section having a smaller cross sectional area than the guide section.
15. The method as claimed in claim 12 wherein the guide wire further comprises a pull section proximal to the guide section, the guide section being stiffer than said pull section.
16. The method as claimed in claim 12 wherein the insertion sheath comprises a sheath/dilator assembly.
17. The method as claimed in claim 12 wherein the blood vessel is the femoral artery or the radial artery.
18. A guide wire having a proximal section and a distal section, said distal section terminating in a tip, said proximal section having a smaller cross sectional area than the distal section.
19. The guide wire as claimed in claim 18 wherein the distal section is stiffer than the proximal section.
20. The guide wire as claimed claim 18 wherein the guide wire has a circular cross section having a diameter and wherein the diameter of the distal section is larger than the diameter of the proximal section.
21. The guide wire as claimed in claim 18 wherein a distal portion of the distal section has a j shaped hook shape.
22. The guide wire as claimed in claim 18 wherein a distal portion of the distal section has a hockey-stick shape.
23. A guide wire having a proximal section and a distal section, said distal section terminating in a tip, said proximal section having a higher stiffness than the distal section.
24. A guide wire having a proximal section, a first distal section, and a second distal section distal the first distal section and terminating in a tip, said first distal

section having a larger cross sectional area than both the proximal section and the second distal section.

25. The guide wire as claimed in claim 24 wherein the second distal section has a larger cross sectional area than the proximal section.
26. The guide wire as claimed in claim 24 wherein first distal section has a higher stiffness than both the proximal section and the second distal section.
27. The guide wire as claimed in claim 24 wherein a distal portion of the second distal section has a j-hook shape.
28. The guide wire as claimed in claim 24 wherein a distal portion of the second distal section has a hockey-stick shape.
29. A guide wire comprising a proximal section, a first distal section, a second distal section, and distal third distal section terminating in a tip, the first distal section being distal to the proximal section, the second distal section being distal to the first distal section, the third distal section being distal to the second distal section, said third distal section having a larger cross sectional area than the second distal section, said first distal section having a larger cross sectional area than the proximal section and the second distal section.
30. The guide wire as claimed in claim 29 wherein the third distal section has a higher stiffness than the second distal section and wherein the first distal section has a higher stiffness than the proximal section and the second distal section.
31. The guide wire as claimed in claim 29 wherein a distal portion of the third distal section has a j-hook shape.
32. The guide wire as claimed in claim 29 wherein a distal portion of the third distal section has a hockey-stick shape.